

# Service Supplement

## M1355-61652, M1356-61661 and M1358-61681 Replacement Transducer Cables

Use the replacement transducer cables to repair **BROWN** transducers **ONLY**.

M1355-61652 is the replacement cable for the **brown** Toco transducer (M1355A).

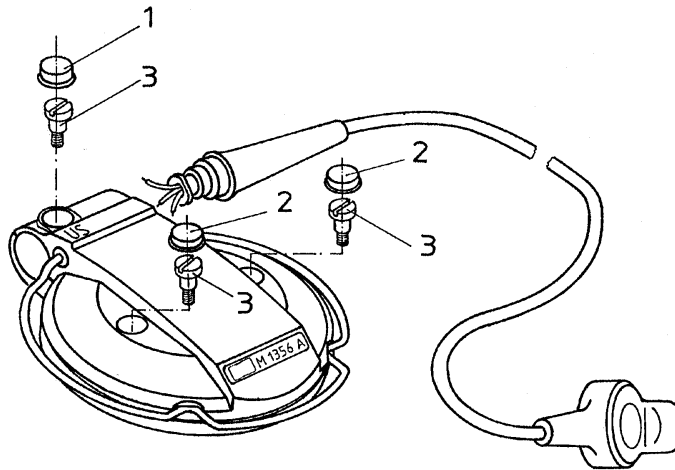
M1356-61661 is the replacement cable for the **brown** Ultrasound transducer (M1356A).

M1358-61681 is the replacement cable for the **brown** US/MECG Combi transducer (M1358A).

**CAUTION** All **blue** M1355A, M1356A and M1358A transducers are sealed, watertight units and are **NOT** repairable. Replacing the cable of a **blue** transducer, or modifying the transducer in any way, will void any warranty, including the guarantee of watertightness.

### Dismantling the Ultrasound Transducer (Brown)

To dismantle the **Brown** ultrasound transducer, proceed as follows:



**CAUTION** Take care when removing the wires as they are thin and can easily be damaged.

- 1 Disconnect the transducer from the monitor.
- 2 Remove screw covers 1 and 2: press a flat screwdriver into the covers and prise them out.

**NOTE** When reassembling the transducer, you will need new screw covers as the old ones cannot be re-used.

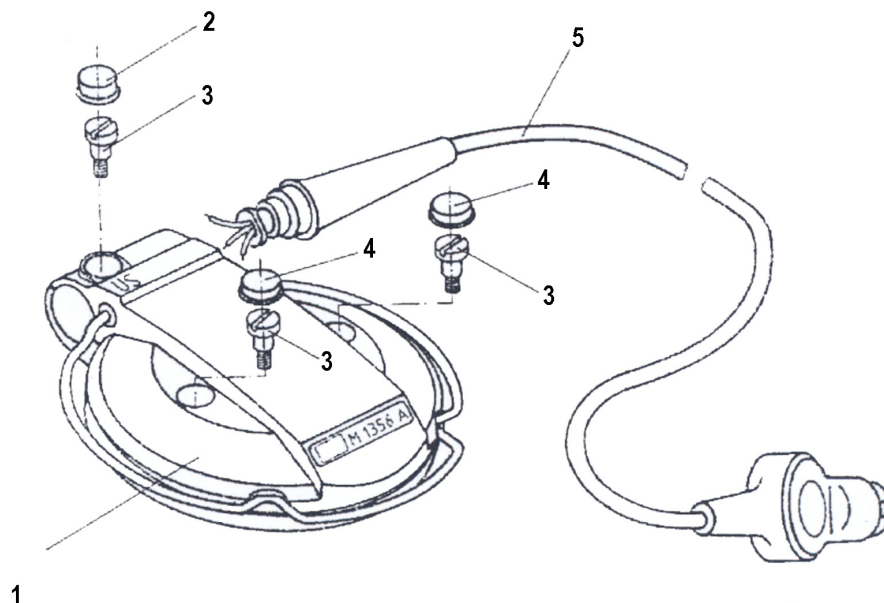
- 3 Partially undo screws 3. The two halves of the transducer can now be separated by pressing down on the screws.
- 4 Remove the screws 3 and pull the two halves of the cover apart.



- 5 Carefully disconnect the transducer cable from the crystal board: use a soldering iron to separate the three cable wires from the board.

Re-assembly is a reversal of the above procedure.

## Parts for the Ultrasound Transducer (M1356A)



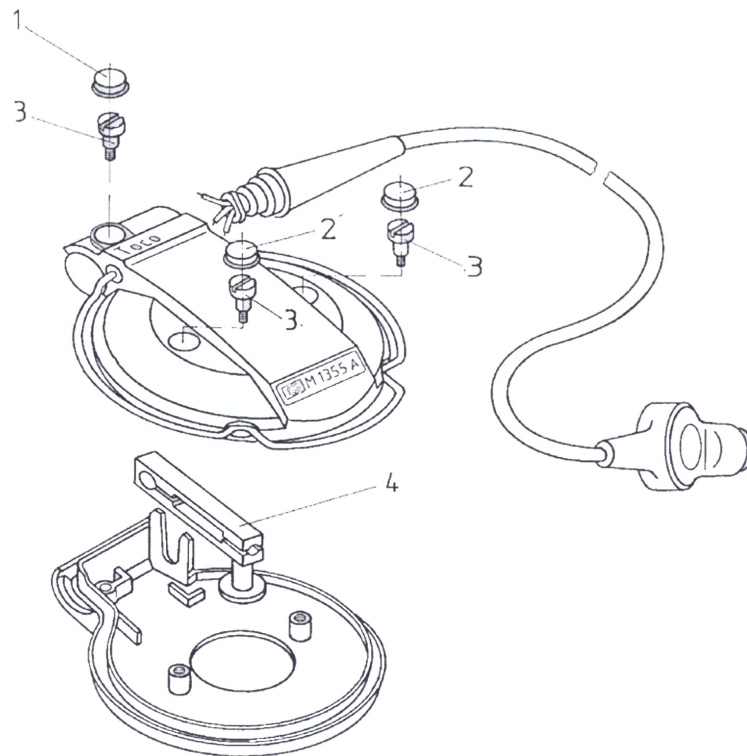
### Ultrasound Transducer: Parts List

Item	Description	Part Number	12NC	Quantity
1	Case Top (US, Brown)	M1356-44562	453563277221	1
2	Cover Screw (Red)	M1356-44106	453563277211	1
3	Screw	0515-2121	453563024231	3
4	Cover Screw (Black)	5041-4274	453563099961	2
5	Cable Assembly (US) 2.5m / 8.2ft	M1356-61661	453563277261	1
-	Transducer Knob Adapters (not shown)	M1356-43201	453563277191	3

### Ultrasound Transducer: Cable Connections

Pin	Cable Color
4	Brown
8	Red
1+6	Bridged by Code Resistor 665 $\Omega$
1	Shield

## Dismantling the Toco Transducer (Brown)



**CAUTION** Take care when removing the wires as they are thin and can easily be damaged. NEVER pull the strain gauge button.

- 1 Disconnect the transducer from the monitor.
- 2 Remove screw covers 1 and 2. Press a flat screwdriver into the covers and prise them out.

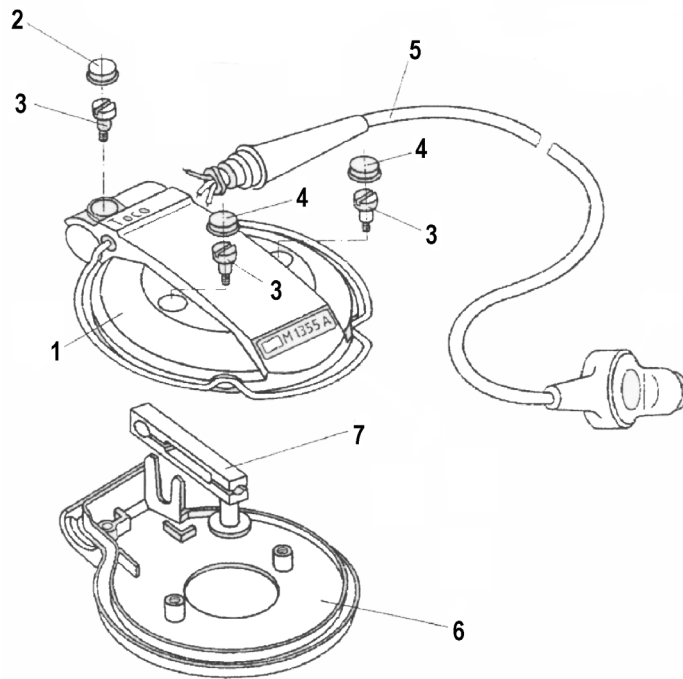
**NOTE** When reassembling the transducer, you will need new screw covers as the old ones cannot be re-used.

- 3 Partially undo screws 3. The two halves of the transducer can now be separated by pressing down on the screws.
- 4 Remove the screws 3 and pull the two halves of the cover apart.
- 5 Disconnect the transducer cable from the strain gauge 4. Use a soldering iron to carefully separate the three cable wires from the gauge.

**CAUTION** NEVER pull the strain gauge button.

- 6 Cut the clips holding the strain gauge and remove it.
- 7 Re-assembly is a reversal of the above procedure. The strain gauge assembly is a press fit into the transducer cover.

## Parts for the Toco Transducer



### Toco Transducer: Parts List

Item	Description	Part Number	12NC	Quantity
1	Case Top (Toco, Brown)	M1355-44552	453563277111	1
2	Cover Screw (Brown)	M1355-44105	453563277091	1
3	Screw	0515-2121	453563024231	3
4	Cover Screw (Black)	5041-4274	453563099961	2
5	Cable Assembly (Toco) 2.5m / 8.2ft	M1355-61652	453563277161	1
6	Case Bottom (Toco, Brown)	M1355-44551	453563277101	1
7	Strain Gauge	0960-0810	453563045191	1

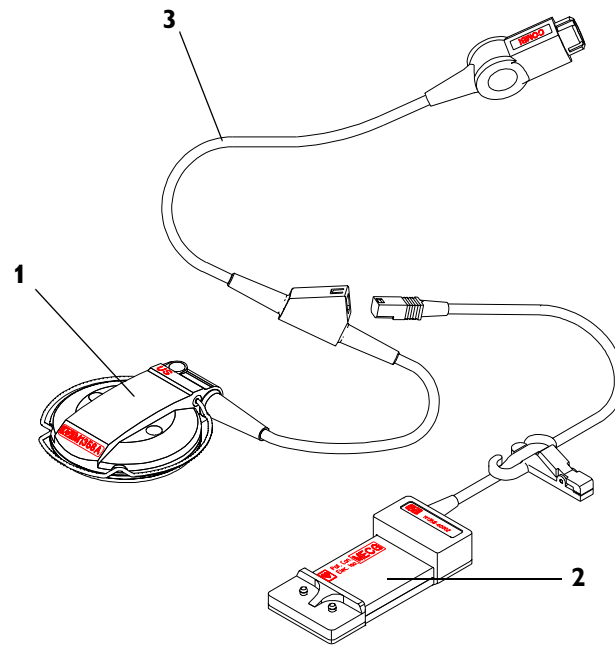
### Toco Transducer: Cable Connections

Connector		Transducer	
Pin	Cable Color	Pin	
2	Yellow	2	
3	Green	4	
4	Blue	1	
8	Orange	3	
1+6	Bridged by Code Resistor 4.53 k $\Omega$	-	

## Dismantling the US/MECG Combi Transducer (Brown)

Follow the instructions for the Ultrasound transducer described on page 1.

### Parts for the US/MECG Combi Transducer



#### Ultrasound Transducer: Parts List

Item	Description	Part Number	12NC	Quantity
1	Combi Transducer (US)	M1358-60011	453563277331	1
2	Combi Transducer (MECG)	M1358-60002	453563277321	1
3	Combi Cable Assy (US)	M1358-61681	453563277341	1

#### Ultrasound Transducer: Cable Connections

Pin	Cable Color
4	Brown
8	Red
5	Green
2	Yellow
6	Red
1+6	Bridged by Code Resistor 665 $\Omega$
1	Shield

## Testing After Repair

After repair, carry out the test and inspection activities described in this section.



**NOTE** Test the US Combi transducer as described for the Ultrasound transducer on page 7. See “Testing MEGG Transducers” on page 9 for how to test the MEGG Combi transducer.

## Performance Assurance Tests

Carry out the monitor self-test and the parameter test.

### Self Test


The monitor automatically performs a basic-level self test when you switch it on. There are two possible types of error that you might see. A fatal error prevents the monitor from functioning. A non-fatal error allows you to continue to work but warns you of a problem that must be resolved swiftly.

- If a non-fatal error occurs (for example, if the batteries are low):
  - An error message is displayed for ten seconds.
  - Err xxx  , time and date are printed on the paper after ten seconds, and then every ten minutes. (“xxx” is the number of the error message.)
  - Switch the monitor off and then on. If the error occurs again, try to solve the problem or, if you cannot, contact your Philips Service Engineer or Response Center.  
(If the recorder is not on when the monitor is switched on, Err xxx  time and date are printed when it is switched on subsequently.)
- If a fatal error occurs (for example, if a board is defective):
  - An error message is displayed for ten seconds
  - After ten seconds, the monitor tries to restart.

If the error occurs again contact your Philips Service Engineer or Response Center.



### Parameter Test

The parameter test tests the processing of the signal to and from the transducer, but not the transducers themselves. To perform the parameter test:

- Switch on the monitor and the recorder.
- Connect the transducers for the channels to be tested to the correct sockets.
- Press .

The monitor produces an artificial signal for each transducer connected and the signals are processed. You will see that the test signal is displayed and the mode symbols light. You will also hear a sound specific for the type of transducer connected.

The following table shows the values recorded when the different transducers are correctly connected.

Ensure that the recorder is switched on. If an error occurs, it is displayed for ten seconds and then Err  is printed by the recorder together with the time/date annotation. After this time, Err  is printed every ten minutes together with the time/date annotation.

### Parameter Test

Signal	Monitor Response
US (Cardio 1/Combi) using M1356A:	190 is displayed and printed. Signal quality indicator is green. Fetal heartbeat is heard from loudspeaker.
US (Cardio 2) using M1356A:	170 is displayed and printed. Signal quality indicator is green. Fetal heartbeat is heard from loudspeaker.
TOCO using M1355A:	A signal alternating between 10 and 60 (for periods of 2 secs) for as long as the key is pressed is displayed and printed.
US/MECG (Cardio 1/Combi) using M1358A:	190 is displayed. 190 and 120 are printed. Signal quality indicator is green. <b>MECG</b> is on. Fetal and maternal heartbeats are heard from the loudspeaker.

## Testing Ultrasound Transducers

Carry out a visual and electrical check of the repaired transducers.

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**CAUTION** Use of ultrasound gel that is not approved by Philips may reduce signal quality and may damage the transducer. This type of damage is not covered by warranty.

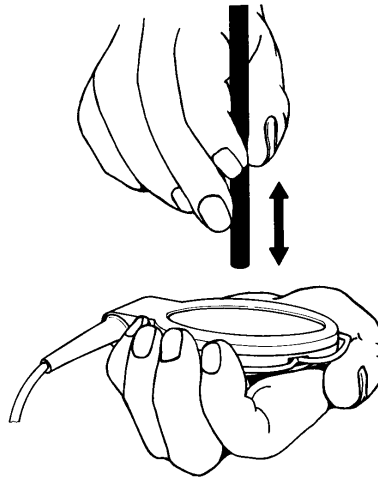
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### Visual Check

Ensure there are no cracks in the transducer dome, that the cable is not cracked or broken, and that there are no cracks on the connector plug.

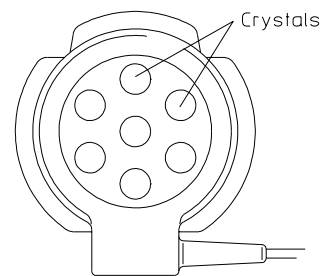
### Electrical Check

- 1 Connect the transducer to either the **Cardio 1/Combi** or **Cardio 2** socket. (Both the connector and socket are red, and keyed so that they mate in only one position.)  
Ensure that:
  - The signal quality indicator is red
  - The FHR numerical display is blank
  - When the recorder is switched on, the date, time, mode and paper speed are printed on the recorder trace.
- 2 Turn the loudspeaker volume up to an audible level.
- 3 The ultrasound transducer contains seven piezoelectric crystals. Basic functioning of each can be verified by holding a flat bottomed pencil or similar above each crystal and moving it up and down as shown.



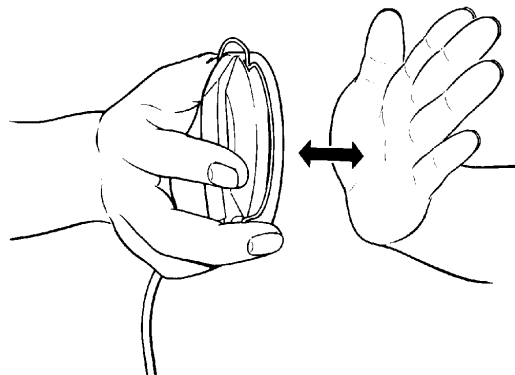
**Figure 1 Testing an Ultrasound Transducer using a Pen**

A sound should be heard for each crystal tested. The pen should be held 2 to 3 cm from the transducer surface when the test is carried out.



**Figure 2 Position of Crystals in an Ultrasound Transducer**

- 4 A sound should also be heard when the transducer is moved back and forth over a solid surface, or the hand as shown below.



**Figure 3 Checking an Ultrasound Transducer**

If the tests are not as outlined above, repeat the tests with another transducer.



## Testing TOCO Transducers

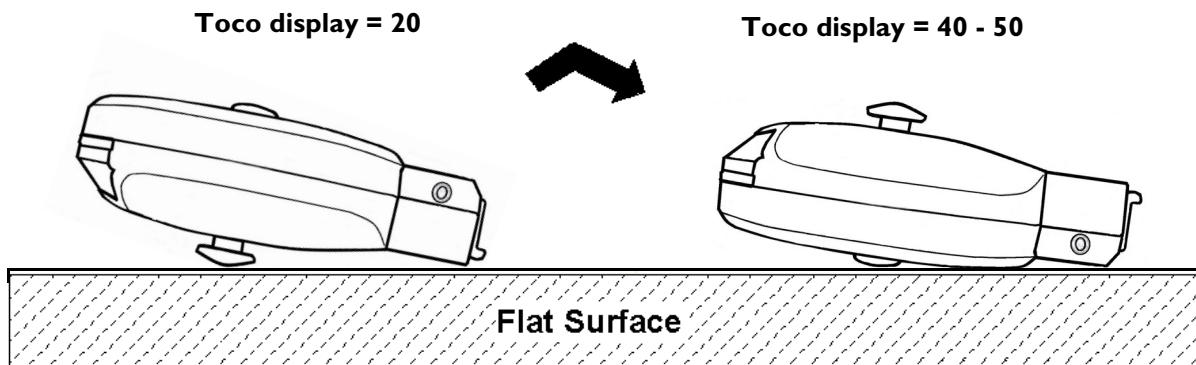
Carry out a visual and electrical check of the repaired transducers.

### Visual Check

Ensure that the transducer housing is sound, that the cable is not cracked or broken, and that there are no cracks on the connector plug.

### Electrical Check

- 1 Connect the Toco transducer to the **Toco** socket. (Both the connector and socket are brown, and keyed so that they mate in only one position.)  
Ensure that:
  - the Toco display shows 20.
  - when the recorder is switched on, the date, time, mode and paper speed are printed on the recorder trace.
- 2 Press the transducer button firmly and look for a deflection on the display and recorder. The external Toco display maximum is 100 units.
- 3 Lay the transducer face up on a flat surface for a few seconds.
- 4 Press the Toco Baseline Key to re-adjust the Toco display to 20.
- 5 Turn the transducer over so that the button is face down on the flat surface. Hold the cable at a point 25 cm from the transducer and ensure that the transducer touches the flat surface only with the button and that the transducer is parallel to the flat surface.
- 6 The Toco display should read between 40 to 50 units.



**NOTE** The illustration does not show the cable. The appearance of the transducer may differ from the illustration. If the test results are not as outlined above, repeat the test with another transducer.

The external Toco recorder display can be between 0 and 127 units. If the test fails, repeat using another transducer. After the test, you must zero the system by pressing the Toco Baseline Key.

## Testing MEGC Transducers

- 1 Connect the two electrode cables (M1531B) from the maternal ECG electrodes (40493D) to the two press fit connectors on the MEGC Combi transducer.
- 2 *EITHER*
  - a. Attach electrodes to the M1531B electrode cables, and apply the electrodes to the skin (for example on the wrists).

*OR*

  - b. Attach the M1531B electrode cables to a patient simulator.

## NOTE

We do not recommend the use of a specific patient simulator. The use of a patient simulator does not allow checking the specification of the ECG-Functionality; it allows only a check of general function.

**Result:** You should see MEGG values displayed on the maternal LCD display or annotated on the recorder trace.

If the test results are not as outlined above, repeat the test with other M1531B electrode cables and/or another MEGG Combi transducer.

## Disposal

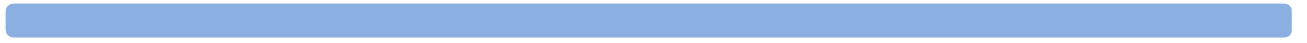
Dispose of the equipment in accordance with your country's laws.

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## WARNING

To avoid contaminating or infecting personnel, the service environment or other equipment, make sure the equipment has been appropriately disinfected and decontaminated before disposal at the end of its useful life.

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Philips Medical Systems  
Cardiac and Monitoring Systems  
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Philips Medizin Systeme Böblingen GmbH  
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Hewlett-Packard Str. 2  
71034 Böblingen  
Germany  
Fax: (+49) 7031 463 1552

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Philips Medical Systems  
1550 Sawgrass Corporate Parkway #300  
Sunrise, FL 33323  
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Philips Medical Systems  
30/F Hopewell Centre  
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